CHAPTER 1

Percentage

1.1 Percentage

(i) If an object's price is increased or decreased by x% and the other factor is increased or decreased by y% then, the net effect is given by

$$\text{Net effect} = \left[x + y + \frac{xy}{100}\right]\%$$

Remember that the percentages (x % and y %) are taken with positive or negative sign according as there is increase or decrease in the factor.

(ii) If the net effect is nil, i.e., there is no loss or no gain, then the above formula become $y = \frac{100x}{100 + x}$

NUMERICAL CHALLENGE 1.1

1. If salary of a person is increased by 10% and 20% successively then, what is the change in his salary ?

Solution

Here x=10, y=20

$\therefore$ The net % change in the salary

$$= \left(10 + 20 + \frac{10 \times 20}{100}\right)\% = 32\%$$

2. The price of a commodity first increased by 20% then decreased by 10% then what is the net change in price of commodity.

Solution

Here x=20, y=–10 then net percent change in price is

$$= \left(20 - 10 + \frac{20 \times (-10)}{100}\right)\% = 8\%$$

Here sign is (+ve) hence the net is (+ve) increase in price.

3. If price of commodity decreased by 20% and then by 30% then find the net change in price ?

Solution

Here x=20, y= 30

$\therefore$ net % change is

$$= \left(-20 - 30 + \frac{-20 \times -30}{100}\right)\% = -44\%$$

ALLEN

node05\B0B0-BA\CBSE\10th\Advance\Maths-2\01_Percentage (Th + Ex.) p65

1.2

(i) If A's income is x% more than that of B, B's Income is less than that of A by $\left[\frac{100.x}{100+x}\right]\%$

(ii) If A's income is x% less than that of B, B's income is more than that of A by $\left[\frac{100.x}{100-x}\right]\%$

NUMERICAL CHALLENGE 1.2

1. If Shailendra's Salary is 20% more than that of Surendra, then how much percent is salary of Surendra less than that of Shailendra.

Solution

Here x=20

$\therefore$ Required Answer= $\left(\frac{x}{100+x}\times 100\right)\%$

$= \frac{20}{120}\times 100\% = 16.66\%$

2. If A's income is 30% less than that of B's income, then how much percent is B's income more than A's income.

Solution

Here x = 30

$\therefore$ Required Answer= $\left(\frac{x}{100-x}\times 100\right)\%$

$= \left(\frac{30}{70}\times 100\right)\% = 42.8\%$

1.3

(i) If A is x% of C and B is y% of C then

$$\mathbf{A = \frac{x}{y}\times 100\% \text{ of } B}$$

NUMERICAL CHALLENGE 1.3

If A is 20% of C and B is 25% of C then what percentage is A of B

Solution

A= $\frac{x}{y}x100 = \frac{20}{25}$ x100=80% of B

1.4

(i) If the price of a commodity increase by p%, then the reduction in consumption so as not to increase the expenditure is $\left(\frac{p}{100+p}\times 100\right)\%$

(ii) If the price of a commodity decrease by p%, then the increase in consumption so as not to decrease the expenditure is $\left(\frac{p}{100-p}\times 100\right)\%$

ALLEN

node05\8080-BA\CBSE\10th\Advance\Maths-2\01_Percentage (Th + Ex.)\p65

NUMERICAL CHALLENGE 1.4

1. If the price of sugar increase by 25%. Find how much percent its consumption be reduced so as not to increase the expenditure.

Solution

$$=\left(\frac{p}{100+p}\times 100\right)\%$$

$$=\frac{25}{125}\times 100\% = 20\%$$

2. If price of commodity decrease by 25%. Find how much percent its consumption be increase so as not to decrease the expenditure.

Solution

$$=\left(\frac{p}{100-p}\times 100\right)\%$$

$$=\frac{25}{100-25}\times 100\% \quad = 33\frac{1}{3}\%$$

1.5

(i) If two numbers are, respectively, x% and y% more than a third number, then the first number. is $\left(\frac{100+x}{100+y}\times 100\right)\%$ of the second and the second is $\left(\frac{100+y}{100+x}\times 100\right)\%$ of the first

(ii) If two numbers are, respectively, x% and y% less than a third number, then the first number is $\left(\frac{100-x}{100-y}\times 100\right)$ of the second and the second is $\left(\frac{100-y}{100-x}\times 100\right)$ of the first

NUMERICAL CHALLENGE 1.5

1. Two numbers are respectively 20% and 50% more than a third number. What percent is the first of the second ?

Solution

Here x=20 and y= 50

$\therefore$ First number = $\left(\frac{100+x}{100+y}\right)\times 100\%$ of the second

$=\left(\frac{100+20}{100+50}\right)\times 100\%$ of the second i.e., 80% of the second

2. Two numbers are respectively, 32% and 20% less than a third number. What percent is the first of the second?

Solution

Here x= 32 and y = 20

$\therefore$ First number = $\left(\frac{100-x}{100-y}\right)\times 100\%$ of the second

$=\left(\frac{100-32}{100-20}\right)\times 100\%$ of the second i.e., 85% of the second

node05\B0B0-BA\CBSE\10th\Advance\Maths-2\01_Percentage (Th + Ex.) p65

1.6 Population formulae

(i) **If the original (present) population of a town is P, then the population (P_0) after n years at an annual increase of r% is given by** $P_0 = P\left(1+\frac{r}{100}\right)^n$

(ii) **If the present population is P, then the population n years ago at an annual increase of r% is given by** $P_0 = \frac{P}{\left(1+\frac{r}{100}\right)^n}$

(iii) **If the population increases by x% during the first year, by y% during the second year, by z% during third year, the population after three years will be** $P\left(1+\frac{x}{100}\right)\left(1+\frac{y}{100}\right)\left(1+\frac{z}{100}\right)$

NUMERICAL CHALLENGE 1.6

1. The population of a town increase 10% annually. If its present population is 120000, what will it be in 2 years time.

Solution

Here P= 120000, r=10, n=2.

$\therefore$ Population after 2 years

$$= P\left(1+\frac{r}{100}\right)^n = 120000\left[1+\frac{10}{100}\right]^2$$

$$=120000\times\frac{110}{100}\times\frac{110}{100}=145200$$

2. The population of a town increase at the rate of 20% annually due to excessive migration. If present population is 144000, find population two year ago.

Solution

$$=\frac{P}{\left(1+\frac{r}{100}\right)^n}=\frac{144000}{\left(1+\frac{20}{100}\right)^2}=\frac{144000}{\frac{120}{100}x\frac{120}{100}}=100000$$

3. The income of Ramesh increase by 10%, 20% and 30% successively in three years. Find change in his income, if present income is 150000 Rs. per annum.

Solution

Here x=10, y=20, z= 30.

A = 150000

So, percent change in income

$$A\left(1+\frac{x}{100}\right)\left(1+\frac{y}{100}\right)\left(1+\frac{z}{100}\right)$$

$$= 1500000\times\left[\left(1+\frac{10}{100}\right)\left(1+\frac{20}{100}\right)\left(1+\frac{30}{100}\right)\right]$$

$$= 1500000\times\frac{110}{100}\times\frac{120}{100}\times\frac{130}{100} = \text{Rs. } 257400$$

ALLEN

node05\B080-BA\CBSE\10th\Advance\Maths-2\01_Percentage (Th + Ex.)\p65

4. The population of a village is 5500. If the number of males increases by 11% and the number of females increases by 20%, then the population becomes 6330. Find the population of females in the town.

Solution

Let x is population of male

$\therefore$ (5500 – x) is female population

$$\frac{x\times 111}{100}+\frac{(550-x)\times 120}{100}=6330$$

On calculating we get x = 3000

So female population = 2500

1.7 Depreciation formulae

(i) If the present price of an article is P, then price P_0 after n years at an annual decrease of r% is given by

$$P_0 = P\left(1-\frac{r}{100}\right)^n$$

(ii) If the present price of an article is P, then the price n years ago (at an annual decrease of r %) is given by

$$P_0 = \frac{P}{\left(1-\frac{r}{100}\right)^n}$$

NUMERICAL CHALLENGE 1.7

1. The population of a city increases at the rate of 10% annually. Its present population is 90.51 lacs. The population 3 years ago was nearly.

Solution

We have, P=90.51, r= 10 and n=3

$\therefore$ The population 3 years ago

$$=\frac{P}{\left(1+\frac{r}{100}\right)^n}=\frac{90.51}{\left(1+\frac{10}{100}\right)^3}$$

$$=\frac{9051}{100}\times\frac{100}{110}\times\frac{100}{110}\times\frac{100}{110}=68 \text{ lacs}$$

2. A building worth Rs. 1,33,100 is constructed on land worth Rs. 72,900. After how many years will the value of both be the same if land appreciates at 10% p.a. and building depreciates at 10% p.a.?

Solution

$$72900\left(1+\frac{10}{100}\right)^n=133100\times\left(1-\frac{10}{100}\right)^n$$

$$\therefore\left(\frac{11}{10}\right)^n x\left(\frac{10}{9}\right)^n=\frac{133100}{72900}=\frac{1331}{729}$$

$$\therefore\left(\frac{11}{9}\right)^n=\left(\frac{11}{9}\right)^3$$

$\Rightarrow n=3$

node05\B0B0-BA\CBSE\10th\Advance\Maths-2\01_Percentage (Th + Ex.).p65

1.8

If after spending p_1% first, then p_2% from the remaining, and so on, B is the balance amount, then the total (original) amount is given by

$$\text{Total amount} = \frac{B \times 100 \times 100 \ldots}{(100 - p_1)(100 - p_2)\ldots}$$

NUMERICAL CHALLENGE 1.8

1. Ram Spends 30% of his salary on house rent, 30% of the rest he spends on his children's education and 24% of the rest salary he spends on cloths. After his expenditure, he is left with Rs. 2500. What is Ram's Salary ?

Solution

Let Total Salary is Rs.P

Let 30% on house rent= x

30% of remaining on childrens education = y

24% of remaining on clothes = z

$$P\left[1-\frac{x}{100}\right]\left[1-\frac{y}{100}\right]\left[1-\frac{z}{100}\right] = 2500$$

$$P\left[1-\frac{30}{100}\right]\left[1-\frac{30}{100}\right]\left[1-\frac{24}{100}\right] = 2500 \text{ [(–) ve sign because of spending]}$$

$$P\left[\frac{70}{100}\right]\left[\frac{70}{100}\right]\left[\frac{76}{100}\right] = 2500$$

P = Rs. 6713.21

2. An Army lost 10% of its men in war, 10% of the remaining due to diseases and 10% of the rest were disabled. Thus, the strength was reduced to 729000 active men. Find the original strength.

Solution

Let A be the original strength

Then, $A\left(1-\frac{x}{100}\right)\left(1-\frac{y}{100}\right)\left(1-\frac{z}{100}\right) = 729000$ (Given)

Here, x = 10, y = 10 and z = 10

$\therefore \quad A\left(1-\frac{10}{100}\right)\left(1-\frac{10}{100}\right)\left(1-\frac{10}{100}\right) = 729000$

$$A = \frac{729000 \times 100 \times 100 \times 100}{90 \times 90 \times 90}$$

$\Rightarrow$ = 1000000 men

ALLEN

node05\B080-BA\CBSE\10th\Advance\Maths-2\01_Percentage (Th + Ex.)\p65

1.9

If the value of a number is first increased by x% and later decreased by x%, the net change is always a decrease which is equal to $\frac{x^2}{100}\%$

NUMERICAL CHALLENGE 1.9

Michael sold two T.V. sets for Rs. 3600 each, gaining 20% on one and loosing 20% on the other. Find the total gain or loss percent.

Solution

Here x = 20

So, overall loss $\left(\frac{x}{10}\right)^2\% = \left(\frac{20}{10}\right)^2\% = 4\%$

1.10

A candidate scoring x% in an examination fails by 'a' marks, while another candidate who scores y% marks gets'b' marks more than the minimum required pass marks. Then the maximum marks for that examination are $M=\frac{100(a+b)}{y-x}$

NUMERICAL CHALLENGE 1.10

In an examination, 35 % candidates failed in one subject and 42% failed in another subject while 15% failed in both the subjects. If 2500 candidates appeared at the examination, how many passed in either subject but not in both ?

Solution

Failed in 1st subject $= \left(\frac{35}{100}\times 2500\right) = 875.$

Failed in 2nd subject $= \left(\frac{42}{100}\times 2500\right) = 1050.$

Failed in both $= \left(\frac{15}{100}\times 2500\right) = 375.$

Failed in 1st subject only= (875 – 375)= 500.

Failed in 2nd subject only= (1050 – 375)= 675

Passed in 2nd only+Passed in 1st only

= (675+500)= 1175

1.11

If in an examination x% of the students failed in one subject, y% failed in another subject and z% in both the subjects, the percentage of student who :

(a) Failed in either of the subjects = x+y-z

(b) Passed in both the subjects= 100-(x+y-z)

node05\B0B0-BA\CBSE\10th\Advance\Maths-2\01_Percentage (Th + Ex.) p65

NUMERICAL CHALLENGE 1.11

1. In an examination, 30% and 35% students respectively failed in History and Geography while 27% students failed in both the subjects. If the number of students passing the examination in 248, find the total number of students who appeared in the examination.

Solution

Percentage of students passing the examination

$= (100 - (30 + 35 - 27))\%$

$[\text{here, } x = 30,\ y = 35 \text{ and } z = 27]$

$= (100 - 38)\% = 62\%$

Let the total number of students appearing in the examination x.

Given: 62% of x= 248

or, $\frac{62}{100} \times x = 248$ or $x = \frac{248 \times 100}{62} = 400$

Therefore, 400 students appeared in the examination.

2. In an examination, there were 2000 candidates, out of which 900 candidates were boys and rest were girls. If 32% of the boys and 38% of the girls passed, then find the total percentage of failed candidates.

Solution

Boys= 900, Girls= 1100

Passed = (32% of 900) + (38% of 1100) = 288 + 418 = 706

Failed = 2000 – 706 = 1294

Failed % = $\left(\frac{1294}{2000} \times 100\right)\% = 64.7\%$

Cost of living index :

An index is a relative number which indicates changes in prices of commodities agricultural production, industrial production, cost of living index etc., over a period of time.

Cost of living index = $\frac{\text{Total expenditure in current year}}{\text{Total expenditure in base year}} \times 100$

NUMERICAL CHALLENGE 1.12

Calculate the cost of living index for the year 2008 taking 2000 as the base year from the following information.

Commodity	Quantity consumed (in kg)	Rate in ₹ per kg)	
		2000	2008
Rice	25	16	20
Oil	5	40	80
Pulses	10	25	40
Vegetables	15	10	16

Sol. Total expenditure in year 2000

=₹ [25 × 16 + 5 × 40 + 10 × 25 + 15 × 10] = ₹ 1000

Total expenditure in year 2008

= ₹ [25 × 20 + 5 × 80 + 10 × 40 + 15 × 16] = ₹ 1540

Cost of living index = $\frac{1540}{1000} \times 100 = 15.4$

node05\B080-BA\CBSE\10th\Advance\Maths-2\01_Percentage (Th + Ex.)\p65

PERCENTAGE

SOLVED EXAMPLES

1. If 40% of the numbers exceeds the 25% of it by 54. Find the number.

Sol. $\frac{\text{any value}}{\text{its rate\% of number}}$ = number (i.e, base number)

Here, 54 stands for the difference of (40% and 25% of number)

$\Rightarrow \frac{54}{(40-25)\%}$ = number

$\Rightarrow \frac{54}{40-25}\times 100 = 300$

2. $P_1\%$ of number N_1 is equal to $P_2\%$ of number N_2. Find what percent of N_1 is N_2 ?

Sol. $\therefore$ Required percentage = $\frac{N_2}{N_1}\times 100\%$

It is given that $\frac{P_1}{100}\times N_1 = \frac{P_2}{100}\times N_2 \left(\therefore \frac{N_2}{N_1} = \frac{P_1}{P_2}\right)$

Putting the value of $\frac{N_2}{N_1}$, we find the required

percentage = $\left(\frac{P_1}{P_2}\times 100\right)\%$

$\therefore$ N_2 is equal to $\left(\frac{P_1}{P_2}\times 100\right)$ % of N_1

3. The ratio of salary of a worker in July to that in June was $2\frac{1}{2} : 2\frac{1}{4}$. By what % was the salary of July more than Salary of June ? Also find by what %, Salary of June was less than of July.

Sol. Let Salary of July $= \frac{5}{2}x$

and Salary of June $= \frac{9}{4}x$

Here the basis of comparison is either the salary of June or the Salary of July.

Salary of July more than that of June by percent.

$= \frac{\text{Difference}}{\text{Salary of June}}\times 100$

$= \frac{\left(\frac{5}{2}-\frac{9}{4}\right)x}{\frac{9}{4}x}\times 100 = 11\frac{1}{9}\%$

Salary of June Less than that of July by percent

$= \frac{\text{Difference}}{\text{Salary of July}}\times 100$

$= \frac{\left(\frac{5}{2}-\frac{9}{4}\right)x}{\frac{5}{2}x}\times 100 = 10\%$

4. The side of a square increases by p%, then find by what% does its area increase ?

Sol. Suppose, side of a square= b

Original area of the square= b^2, i.e., result = A x B

Here, both sides are increased by p%

Net % change in area = $x + y + \frac{xy}{100}$, where,

$x = y = + p$

$\Rightarrow$ Net % change in area =

$p + p + \frac{p^2}{100} = 2p + \frac{p^2}{100}$

Hence area increase by $\left(2p+\frac{p^2}{100}\right)\%$

Note: This formula is also applicable when the radius of circle is increased by p% then its area increased by $\left(2p+\left(\frac{p^2}{100}\right)\right)\%$

5. The daily wage is increased by 15%, and a person now gets Rs. 23 per day. What was his daily wage before the increase ?

Sol. Original Daily wage = $\frac{\text{Increased daily wage}}{100 + \%\text{ increase}}\times 100$

$= \frac{23}{115}\times 100 = 20$

Note : In case of decrease use (-) ve sign, before % value.

6. A student X passes his examination with 515 marks, having scored 3% above the minimum. If Y had obtained 710 marks, what % would he have been above the minimum ?

node05\B0B0-BA\CBSE\10th\Advance\Maths-2\01_Percentage (Th + Ex.) p65

Sol. $\frac{\text{Marks of Y}}{\text{Marks of X}} = \frac{100 + \%\text{ above minimum of Y}}{100 + \%\text{ above minimum of X}}$

$$\frac{710}{515} = \frac{100 + Y}{100 + 3} \Rightarrow Y = +42\,\%$$

Hence Y gets 42% above minimum

Note:- Similarly, if the % marks is below minimum, formula would have been.

$$\frac{\text{Marks of Y}}{\text{Marks of X}} = \frac{100 - \%\text{ below minimum of Y}}{100 - \%\text{ above minimum of X}}$$

Remember,

$$\frac{\text{Marks of Y}}{\text{Marks of X}} = \frac{100 \pm \%\text{ above/below minimum of Y}}{100 \pm \%\text{ above/above minimum of X}}$$

7. The ratio of number of boys and girls in a school is 3 : 2, if 20% of boys and 25% of the girls are holding scholarship, find the % of school students who

(a) hold scholarship

(b) do not hold scholarship

Sol. Percentage of scholarship holders

= (Boys × % boys who are scholarship holders) + (Girls × % Girls who are scholarship holders)

$$\left(\frac{3}{2+3} \times 20\right) + \left(\frac{3}{3+2} \times 25\right) = 22\,\%$$

Similarly, percentage of non scholarship holders

$$= \left(\frac{3}{2+3} \times 80\right) + \left(\frac{3}{2+3} \times 75\right) = 78$$

(Since 100 – 20 = 80, 100 – 25 = 75)

8. A reduction of Rs 2 per kg enables a man to purchase 4 kg more sugar for Rs. 16, Find the original price of Sugar.

Sol. Here expenditure is fixed (=Rs.16), but as rate reduces (by Rs. 2/kg), so, the quantity of sugar available increases (by 4 kg.) Let original price be Rs x/kg.

$$\frac{\text{Expenditure}}{x} + \text{change in quantity available}$$

$$= \frac{\text{Expenditure}}{\text{New rate}}$$

$$\Rightarrow \frac{16}{x} + 4 = \frac{16}{x-2} \Rightarrow x^2 - 2x - 8 = 0$$

$$\Rightarrow (x-4)(x-2) = 0 \Rightarrow x = 4 \text{ or } -2$$

Considering the +ve value original price = Rs 4 per kg.

9. If 10% of an electricity bill is deducted. Rs 45 is still to be paid. How much was the bill ?

Sol. Here Rs 45 refers to (100-10) % of the bill Since 90% of bill = 45

$$\Rightarrow 100\%\text{ of bill} = \frac{45}{90} x 100 = 50$$

Hence the bill was 50.

10. The weight of a sand bag is 40 kg. In a hurry, it was weighed as 40.8 kg. Find the error percentage.

Sol. $\%\text{ Error} = \frac{\text{False weight} - \text{Actual weight}}{\text{Actual weight}} \times 100$

$$= \frac{40.8 - 40}{40} \times 100 = 2\%$$

$\therefore$ The error is 2%

ALLEN

node05\B080-BA\CBSE\10th\Advance\Maths-2\01_Percentage (Th + Ex.)\p65

1. The number of enrollments in a school has increased from 1800 to 2016. The percentage increase in the enrollments is _____.
(1) 10% (2) 11%
(3) 12% (4) 13%

2. The price of a commodity is increased by 40%. By what percent should a consumer reduce his consumption so that his expenditure on the commodity remains constant?
(1) $25\frac{4}{7}\%$ (2) $26\frac{4}{7}\%$
(3) $27\frac{4}{7}\%$ (4) $28\frac{4}{7}\%$

3. If Ram's salary went up by 25%, then by what percent should it be brought down to bring it to its initial value?
(1) 25% (2) 20% (3) 33.33% (4) 37.5%

4. A number, when decreased by 20% becomes 136. What is the number?
(1) 160 (2) 150 (3) 170 (4) 140

5. If 60% of K is 30 less than 75% of K, then what is the value of K?
(1) 500 (2) 300 (3) 400 (4) 200

6. The length of a rectangle is increased by 10% while its breadth is decreased by 10%. what is the consequent percentage change in the area of the rectangle?
(1) 1% increase (2) 10% increase
(3) 10% decrease (4) 1% decrease

7. In an examination, Ramu and Raju secured 783 marks and 684 marks respectively. If Ramu secured 87% marks, then the percentage of marks secured by Raju is _____.
(1) 75% (2) 76% (3) 77% (4) 78%

8. By what percent will the area of a square change if its side is increased by 10%?
(1) 10% increase (2) 20% increase
(3) 10% decrease (4) 21% increase

9. The population of a city increases by 30% every year. If the present population is 338000, then what was the population of the city two years ago?
(1) 300000 (2) 250000
(3) 200000 (4) 240000

10. 60% of 264 is the same as
(1) 10% of 44 (2) 15% of 1056
(3) 30% of 132 (4) None of these

11. How many litres of pure acid are there in 8 litres of a 20% solution?
(1) 1.4 (2) 1.5 (3) 1.6 (4) 2.4

12. What is 25% of 25% equal to?
(1) 0.00625 (2) 0.0625 (3) 0.625 (4) 6.25

13. $\sqrt{784}$ +? = 78% of 500
(1) 342 (2) 352
(3) 362 (4) 372

14. Two-fifth of one-third of three-seventh of a number is 15. What is 40 percent of that number?
(1) 72 (2) 84 (3) 136 (4) 105

15. The difference between a number and its two-fifth is 510. What is 10% of that number?
(1) 12.75 (2) 85
(3) 204 (4) None of these

16. A number, when 35 is subtracted from it, reduces to its 80 percent. What is four-fifth of that number?
(1) 70 (2) 90 (3) 120 (4) 140

17. If one number is 80% of the other and 4 times the sum of their squares is 656, then the numbers are
(1) 4, 5 (2) 8, 10
(3) 16, 20 (4) None of these

18. A student multiplied a number by $\frac{3}{5}$ instead of $\frac{5}{3}$. What is the percentage error in the calculation?
(1) 34% (2) 44% (3) 54% (4) 64%

19. In a certain school, 20% of students are below 8 years of age. The number of students above 8 years of age is $\frac{2}{3}$ of the number of students of 8 years age which is 48. What is the total number of students in the school?
(1) 72 (2) 80 (3) 120 (4) 100

20. If x is 80% of y, then what percent of 2x is y?
(1) 40% (2) $62\frac{1}{2}\%$
(3) $66\frac{2}{3}\%$ (4) 80%

21. A man spends 35% of his income on food, 25% on children's education and 80% of the remaining on house rent. What percent of his income he is left with?
(1) 8% (2) 10%
(3) 12% (4) 14%

node05\B0B0-BA\CBSE\10th\Advance\Maths-2\01_Percentage (Th + Ex.) p65

22. A salesman is allowed $5\frac{1}{2}\%$ discount on the total sales made by him plus a bonus of $\frac{1}{2}\%$ on the sales over Rs. 10,000. If his total earnings were Rs. 1990, then his total sales (in Rs.) were

(1) 30,000 (2) 32,000 (3) 34,000 (4) 35,000

23. What percent decrease in salaries would exactly cancel out the 20 percent increase?

(1) $16\frac{2}{3}$ (2) 18 (3) 20 (4) $33\frac{1}{3}$

24. If inflation increases at a rate of 8% p.a., what will a Rs. 20 article cost at the end of two years?

(1) Between Rs. 20 and Rs. 21

(2) Between Rs. 21 and Rs. 22

(3) Between Rs. 22 and Rs. 23

(4) Between Rs. 23 and Rs. 24

25. The value of a machine depreciates at the rate of 10% every year. It was purchased 3 years ago. If its present value is Rs. 8748, its purchase price was

(1) Rs. 10,000 (2) Rs. 11,372

(3) Rs. 12,000 (4) Rs. 12,500

26. Two numbers are less than a third number by 30% and 37% respectively. How much percent is the second number less than the first?

(1) 3% (2) 4% (3) 7% (4) 10%

27. Two candidates contested for a post of an election. 70 votes were declared as invalid. The victorious candidate secured 55% votes and won the election by 90 votes. Total numbers of votes polled is

(1) 475 (2) 565 (3) 970 (4) 1070

28. In an examination, 450 candidates were boys and 550 were girls. If 32% of the boys and 38% of the girls passed the examination, the percentage of failed candidates is

(1) 35.3% (2) 62% (3) 64.7% (4) 68%

29. In an examination, a candidate must secure 45% marks to pass. Ashok secures 325 marks but he fails by 35 marks. What were the maximum marks for the examination?

(1) 1800 (2) 900 (3) 800 (4) 750

30. To reduce a given number by $12\frac{1}{2}$ percent, we should multiply it by

(1) 1/8 (2) 12.5 (3) 7/8 (4) 2/25

31. The population of a village at the beginning of a year was 10000. During that, it increased by 5 percent and during next year decreased by 5 percent. At the end of the second year, the population of the village was

(1) 9975 (2) 10500 (3) 10525 (4) 10075

32. The value of a machine depreciates from Rs. 32768 to Rs. 21952 in three years. What is the rate percentage of depreciation?

(1) 11% (2) 12.5% (3) 33% (4) 12.25%

33. As a percentage $\left(3\frac{13}{14}\right)\times\frac{7}{11}$ can be written as

(1) 2.5% (2) 0.025% (3) 250% (4) 0.25%

34. The population of a city increases at the rate of 10% annually. Its present population is 90.51 lacs. The population 3 years ago was nearly.

(1) 60 lacs (2) 68 lacs (3) 71 lacs (4) 72.8 lacs

35. A man loses $12\frac{1}{2}\%$ of his money and after spending 70% of remainder, is left with Rs. 210 He initially had

(1) Rs. 800 (2) Rs. 600 (3) Rs. 840 (4) Rs. 900

36. If the area of rectangle is increased by 13% when its breadth is increased by 5%, then what is the percentage increase in its length? (approximately)

(1) 10% (2) 8% (3) 18% (4) 12%

37. A man donated 6% of his income to a charity and deposited 20% of the rest in a bank. If he is left with Rs 14,100, then his income is _____.

(1) Rs 18000 (2) Rs 18250

(3) Rs 18500 (4) Rs 18750

38. The quantities consumed and the cost per kg of the commodities for the years 1986 and 1995 are given in the table below

Item	Quantity consumed (kg)	Cost per kg(in Rs)	
		In 1986	In 1995
Wheat	34	5	8
Butter	16	30	50
Sugar	4	10	16
Tea	8	80	100
Rice	15	18	20

The cost of living index for the year 1995 taking 1986 as base year is equal to _____.

(1) 139.00 (2) 139.75

(3) 139.50 (4) 139.25

node-05\8080-8A\CBSE\10th\Advance\Maths-2\01_Percentage (Th + Ex.).p65

39. The price of an article increase by 10%, 15% and 20% in 3 consecutive weeks. What is the approximate overall percentage increase for the 3 weeks.
(1) 45% (2) 62% (3) 35% (4) 52%

40. A reduction of 10% in the price of an article enables a dealer to purchase 25 articles more for Rs 45000. What is the original price of the article?
(1) Rs 100 (2) Rs 150 (3) Rs 200 (4) Rs 250

41. A solution of 165 litres contains 80% of acid and the rest water. How much water must be added to the above solution such that the resulting mixture contains 25% water?
(1) 11 litres (2) 8 litres
(3) 9 litres (4) 10 litres

42. Laxman saves 10% more than his expenditure and Bhuwan spends 10% more than his savings. If Laxman's savings is 10% more than Bhuwan's expenditure, What is the ratio of incomes of Laxman and Bhuwan?
(1) 9 : 10 (2) 100 : 99
(3) 10 : 11 (4) 11 : 10

43. Madan spends 50% of his income on household expenditure and 60% of the remaining on personal expenditure. Of the remaining, he pays 50% towards income tax and saves the remaining Rs 1200. What is the personal expenditure of Madan?
(1) Rs 1800 (2) Rs 2400
(3) Rs 3600 (4) Rs 4800

44. In the year 2001, the price of article A is 20% more than the price of article B. In the year 2002, the price of article A is 50% more than the prices of article B. From 2001 to 2002, if the price of A has increased by 50%, by what percent has the price of B increased?
(1) 0 (2) 10 (3) 20 (4) 25

45. When the price of an article is increased by 15%, the number of articles sold decreases by 20%. What is the percentage change in the sales revenue? (Sales revenue = price of each article ×number of articles sold).
(1) 5% increase (2) 3% decrease
(3) 8% increase (4) 8% decrease

46. A's savings is 30% less than B's savings, B's savings is 20% less than C's savings. By what percentage is C's savings more than A's savings?
(1) $63\frac{2}{7}\%$ (2) $52\frac{1}{3}\%$
(3) $64\frac{3}{5}\%$ (4) $78\frac{4}{7}\%$

47. A solution of 150 litres contains 60% of milk and the rest water. How much water must be added to the above solutions such that the resulting mixture contains 50% of water (in lts)?
(1) 60 (2) 80 (3) 20 (4) 30

48. In an election there are three contestants A, B and C. A secured 30% of the votes and B secured 60% of the remaining votes. If C secured 14000 votes, then by how many votes did the winner win the election?
(1) 5000 (2) 6000 (3) 7000 (4) 8000

49. The total expenditure of a family in 1920 is Rs 8,000. The cost of living index for the year 1920 taking 1910 as the base year is 160. Then, the expenditure of the family in the year 1910 was _____.
(1) Rs 3000 (2) Rs 4000
(3) Rs 5000 (4) Rs 6000

50. When the price of an article is increased by p%, the quantity of sales decrease by 10% but sales revenue increases by 10%. Find p.
(1) 20 (2) $22\frac{2}{9}$ (3) $18\frac{2}{11}$ (4) 30

51. In the year 2000, rice formed 20% of total foodgrain production in a country. In the next year, total foodgrain production increased by 20% and rice production was 25% of total foodgrain production. What is the increase in the production of rice from 2000 to 2001?
(1) 25% (2) 50% (3) 40% (4) 30%

52. In school X, the number of boys is more than that of the girls by 40%. In school Y, the number of girls is more than that of boys by 50%. If 50% boys in school X is equal to 70% of girls in school Y, what is the ratio between number of students of school X and school Y?
(1) 24 : 25 (2) 16 : 17
(3) 3 : 4 (4) 36 : 25

53.

Commodity	Quantity (in kg)	Rate per kg (in Rs)	
		Base year 2005	Current year 2007
X	50	17	20
Y	10	50	60
Z	5	30	P

The cost of living index for the year 2007 considering the base year as 2005 is Rs 120. Find P.
(1) 36 (2) 40 (3) 45 (4) 50

node06\B0B0-BA\CBSE\10th\Advance\Maths-2\01_Percentage (Th + Ex.) p65

54. A manufacturer purchase a second hand machine for Rs 60000 and spends some amount towards repairs then its value goes upto Rs 90000. If depreciation is 10% p.a, what will be the value of the machine after two years?
(1) Rs 48600 (2) Rs 81000
(3) Rs 67200 (4) Rs 72900

55. A's expenditure is 20% more than B's expenditure. B's expenditure is 30% less than C's expenditure. By what percentage is A's expenditure less than C's expenditure?
(1) 16% (2) 12% (3) 14% (4) 18%

56. The side of square ABCD is 20% longer than the side of square PQRS. By what percentage is the area of ABCD more than the area of PQRS?
(1) 20% (2) 24% (4) 40% (4) 44%

57. If A is 50% more than B, then B is less than A by _____.
(1) $33\frac{1}{3}\%$ (2) 25% (3) 50% (4) $66\frac{2}{3}\%$

58. Jacob and Mohan save 20% and 40% of their respective incomes. If their expenditures are equal, then what is the ratio of the incomes of Mohan and Jacob?
(1) 1 : 2 (2) 3 : 4 (3) 2 : 1 (4) 4 : 3

59. Three commodities, their consumption and their prices in the years 1985 and 1990 are listed below

Commodity	Consumption	Price in 1985 (in Rs/kg)	Price in 1990 (in Rs/kg)
Rice	90 kg	14.00	18.00
Wheat	150 kg	9.00	9.48
Tea	9 kg	75.00	100.00

The cost of living index for the year 1990 taking 1985 as base years is equal to _____.
(1) 100 (2) 10 (3) 120 (4) 130

60. There are 3 numbers. The first and second numbers are 20% and 40% more than the third number. What percentage is the first number of the sum of the second and the third numbers?
(1) 25% (2) 50% (3) 30% (4) 40%

ALLEN

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	3	4	2	3	4	4	2	4	3	2	3	2	3	4	2	4	2	4	4	2
Que.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	1	3	1	4	3	4	3	3	3	3	1	2	2	2	1	2	4	2	4	3
Que.	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	1	4	3	3	4	4	4	2	3	2	2	4	2	4	1	4	1	4	3	2

node05\B080-BA\CBSE\10th\Advance\Maths-2\01_Percentage (Th + Ex.)p65